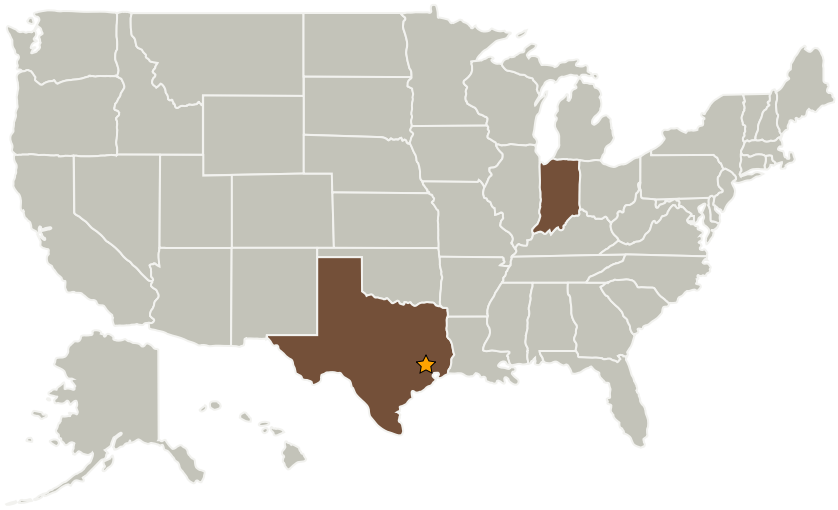
Sample Management System for Heavy Ion Irradiation, Phase II

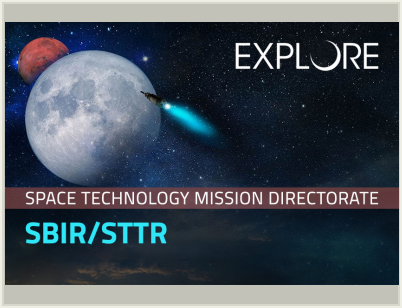
Completed Technology Project (2006 - 2008)

Project Introduction

A robotic sample management device and system for the exposure of biological and material specimens to heavy ion beams of the NASA Space Radiation Laboratory (NSRL) and other irradiation venues is proposed by SHOT, Inc. Full and efficient utilization of NSRL requires the automation of precise sample positioning and sample exchange that is otherwise performed manually at the cost of hours of beam time, compromised biostatistics and risk of personnel. The device and system will consist of eight sample holders providing an environmentally controlled enclosure. Samples to be irradiated will be translated into the ion beam, one at a time, within the controlled environment. Samples to be accommodated include, but are not limited to, cell cultures (multiple containers), small animal (flies, worms, fish) cultures, mice, rats and small samples of shielding or electronic materials. Operating software will be compatible with that in use at the irradiation venues, specifically NSRL, and will be used to establish environmental control settings, to record environmental conditions, and to control and record the insertion of samples into the ion beam. Stray doses to samples in waiting will be less than 0.001 of the dose delivered to exposed samples, and measures are included to minimize neutron flux within the sample chamber assembly. Total and neutron doses will be measured. Three objectives will be met in Phase II research: (1) implementation of user requirements (determined in Phase I) in a final design to be subjected to Critical Design Review (2) construction and testing of a complete sample management system at SHOT, and (3) installing the final prototype product at NSRL and placing it into use for the benefit of the user community.

Primary U.S. Work Locations and Key Partners





Sample Management System for Heavy Ion Irradiation, Phase II

Table of Contents

Project Introduction 1
Primary U.S. Work Locations and Key Partners 1
Organizational Responsibility 1
Project Management 2
Technology Areas 2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

Sample Management System for Heavy Ion Irradiation, Phase II

Completed Technology Project (2006 - 2008)

Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Techshot, Inc.	Supporting Organization	Industry	Greenville, Indiana

Primary U.S. Work Locations	
Indiana	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.3 Manipulation
    - TX04.3.4 Sample Acquisition and Handling